Listing of All Claims Including Current Amendments

1. (currently amended) A method for detecting an impurity in a sample having at least one analyte comprising the steps of:

obtaining characteristic measurements of the sample;

selecting a value representing an anticipated number of components in the sample;

generating a matrix representing said characteristic measurements for the sample, said characteristic measurements having at least two variables in each dimension;

repeatedly selecting a subset within said matrix for analysis of the relation between the analyte and impurity;

constructing a projection matrix by projecting each of the characteristic measurements onto said subset to calculate a residual error; and

calculating an index from said subset to assess purity of the sample.

2. (original) The method of claim 1 wherein said index represents a purity index.

3. (original) The method of claim 1 wherein said index represents an impurity index.

4. (original) The method of claim 1 wherein said characteristic measurements contain a baseline component.

5. (original) The method of claim 1 wherein said characteristic measurements do not contain a baseline component.

6. (original) The method of claim 1 wherein said characteristic measurements are spectra associated with a chromatographic peak.

7. (original) The method of claim 3 wherein said impurity index is represented as E and calculated according to the equation:

$$E = \sqrt{\frac{e^T e}{n - r_0 - r_1}}$$

8. (original) The method of claim 6 wherein said matrix is dimensioned with data representing retention times for the chromatographic peak and wavelengths for the spectra.

9. Cancelled.

10. (currently amended) The method of claim ~~9~~ 1 further comprising the step of calculating said residual error represented by e according to the equation:

$$e = (I - P_0)r$$

11. (original) The method of claim 1 wherein said subset is represented by a sub-matrix R_j having values which can be decomposed into the expression:

$$R_j = U_j S_j V_j^T$$

12. (original) The method of claim 2 wherein said purity index is represented by k_j and is calculated from S_j according to the equation:

$$k_j = \frac{\sum_{i=1}^{r_0 + r_1} S_i}{S_r}$$

13. (original) The method of claim 11 wherein said sub-matrix R_j changes its said values as it moves consecutively from one set of p columns to another such that said sub-matrix R_j is formed by taking the $[j-(p-1)/2]$ th to $[j+(p-1)/2]$ th column of said matrix represented by **R**, for each j where $(p-1)/2+1 \square j \square n-(p-1)/2$.

14 -25. Cancelled.